

A study in community sustainability by the UT Austin School of Architecture in collaboration with the George Washington Carver Museum and Cultural Center

# RENOVATING SUBURBIA

*Statement of Intent: “To improve quality of life for current and future Manor residents in the execution of high quality design intended to enhance human health and well-being while honoring the ecological assets of the site”*

The George Washington Carver  
Museum and Cultural Center

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## PHASE 1 THE SCALE OF THE HOME

We begin by looking at suburban homes from a “supply-side” view in which homes are consumer products that can be designed to be more efficient.

## PHASE 2 THE SCALE OF THE REGION

To more fully address sustainability, we then move to a “demand-side” view to strategize how to reduce overall system demand and enhance environmental community conditions via infrastructure.

## PHASE 3 THE SCALE OF THE NEIGHBORHOOD

Finally, an “effect-side” view looks at how neighborhood-level design affects existing and future residents of Manor by integrating density, infrastructure, and increased social and architectural diversity.

# PHASE 1

THE SCALE OF THE HOME

# PHASE 2

THE SCALE OF THE SUBREGION

# PHASE 3

THE SCALE OF THE NEIGHBORHOOD



# 01 WE'RE MOVING!



## *Why choose the suburbs?*

Bigger house, lower price tag  
Better education for my kids  
Lower crime rate than the inner city  
More amenities  
Status symbol to family, friends and coworkers  
Living the American Dream



## *But moving to the suburbs has other effects...*

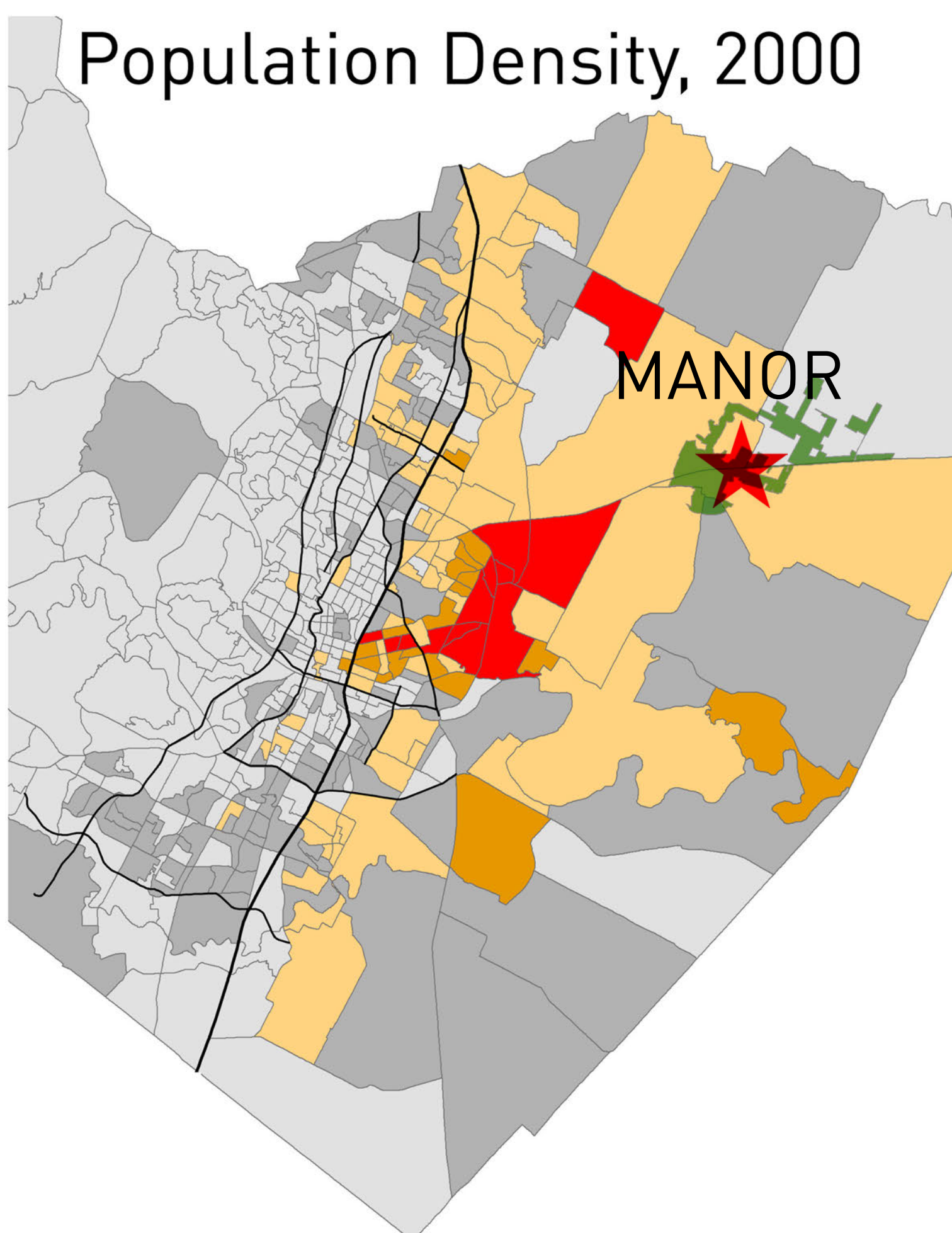
Suburbs are generally more isolated  
Energy prices may vary and cost residents more money  
Suburbs create sprawling cities which have major environmental consequences  
And what happens when the prices of utilities, water and gasoline increase?



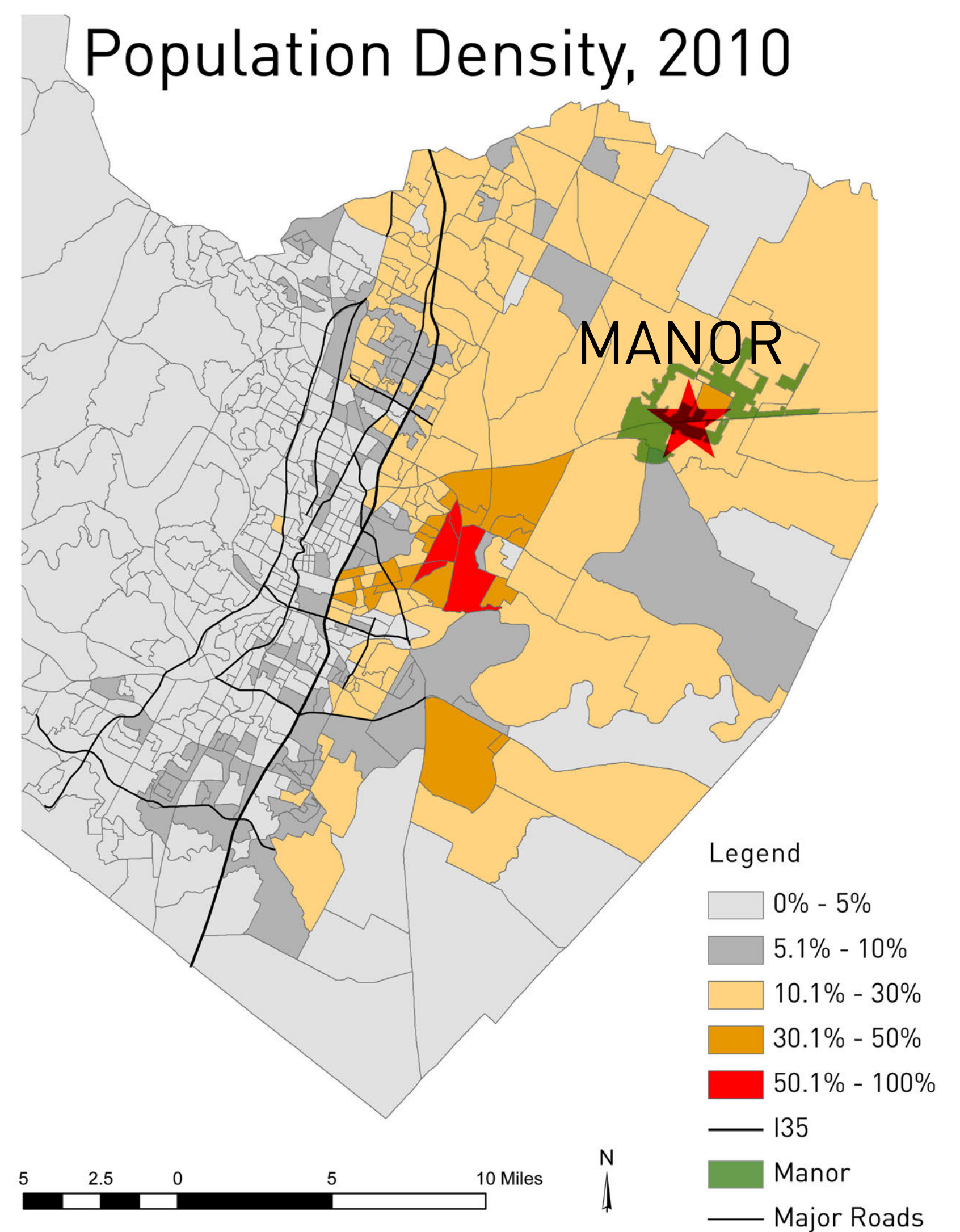
# 02 WHO IS MOVING?

*Between 2000 and 2010, the African-American population of Austin dropped from approximately 10% to 7.8% of the total city population. African-American population increased for surrounding towns and suburbs.*

African-American  
Population Density, 2000



African-American  
Population Density, 2010





03

AND IT'S SO EASY WITH KB HOME



*The KB Home Buying Experience*  
“Built to order”

- Built as needed in subdivision
- Homebuyer selects the site they want in the neighborhood
- Basic model + options picked from the KB Home Studio
- 30-year mortgage through their lender
- Home options included in mortgage to avoid up-front costs



*Homebuyer Savings*

- USDA loan program: \$0 down payment, up to 100% financing
- Few models and easy construction pass savings to buyers
- ENERGY STAR rated homes reduce energy use
- Energy Performance Guide (EPG) shows average monthly bill
- 10-year warranty on most major home systems



04

WELCOME TO SHADOW GLEN



*Built to Order Home Designs*

Design your dream home with the features and decor options that fit your style and way of life. All at the price you can afford!



Size	Stories	Rooms	Price	Monthly Payment
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1,340 sq ft	1	3-4 Bedrooms 2 Baths 2 Car Garage	\$114, 450	From \$985 a month*
1,516 sq ft	1	3 Bedrooms 2.5 Baths 2 Car Garage	\$118, 450	From \$1,020 a month*





## 05 OOPS! SURPRISE COSTS



### *Commuting - gas and vehicle maintenance*

From East Austin, you could expect to spend 4.25 hours and \$36 a month in commuting to a central Austin employer  
From ShadowGlen, your commute cost will have risen to 27 hours and \$417 a month. That means 5 hours of commuting and \$104 in gas a week.

+\$4,572 / yr



### *Electricity costs*

In East Austin, the average monthly electric bill is \$95  
In ShadowGlen, you would be a Bluebonnet Electric customer, which means higher rates that bring your average bill to \$170.

+\$900 / yr



### *Water costs*

In East Austin, your average monthly water bill would be \$90  
In ShadowGlen, your water bill for the same amount of water would be \$103.

+\$165 / yr

Additional expenditures:

\$5,637 / yr

## 06 AND SOCIAL COSTS



### *Some things have different kinds of costs...*

You're disconnected from your Austin community  
Sometimes the schools aren't better

Some children adjust poorly to a new school  
longer commutes: and fuel + time = money!

Polluted air causes asthma and other health risks  
These costs add up to you and other taxpayers!



### *And what does it cost future generations?*

Suburbs used to be fields and forests

Lower air quality from all the vehicle exhaust

Rain that falls on roads and parking lots picks up pollution

Pollution affects the health of our rivers and lakes

... These too are costs to current and future taxpayers!





*Is this really your  
dream home?*

*What if it could be  
better?*

*Two KB homes (one and two storey) were analyzed to determine costs and savings of the following sustainable choices:*



PROPER ORIENTATION



IMPROVED APPLIANCES



ARCHITECTURAL IMPROVEMENTS



IMPROVE LANDSCAPE

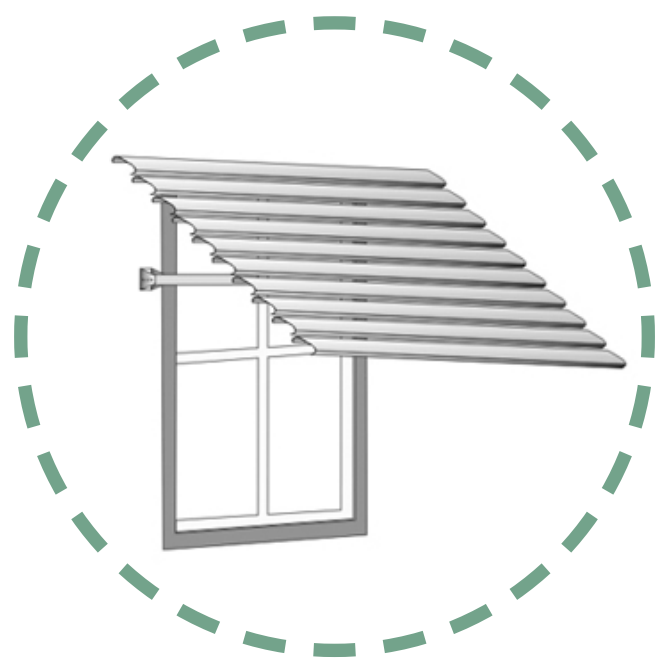


*The goal:*

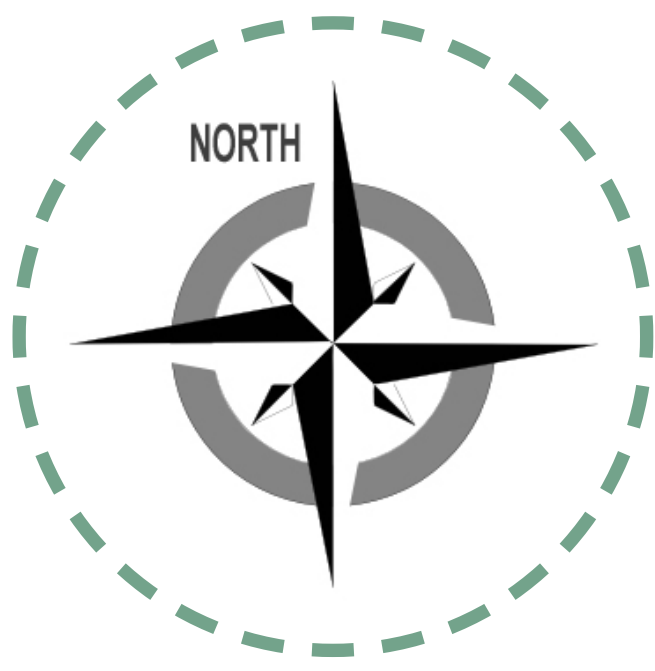
LOWER INDIVIDUAL AND COMMUNITY COSTS

APPROACHING SUSTAINABILITY IN SMALL STEPS



*Shading*

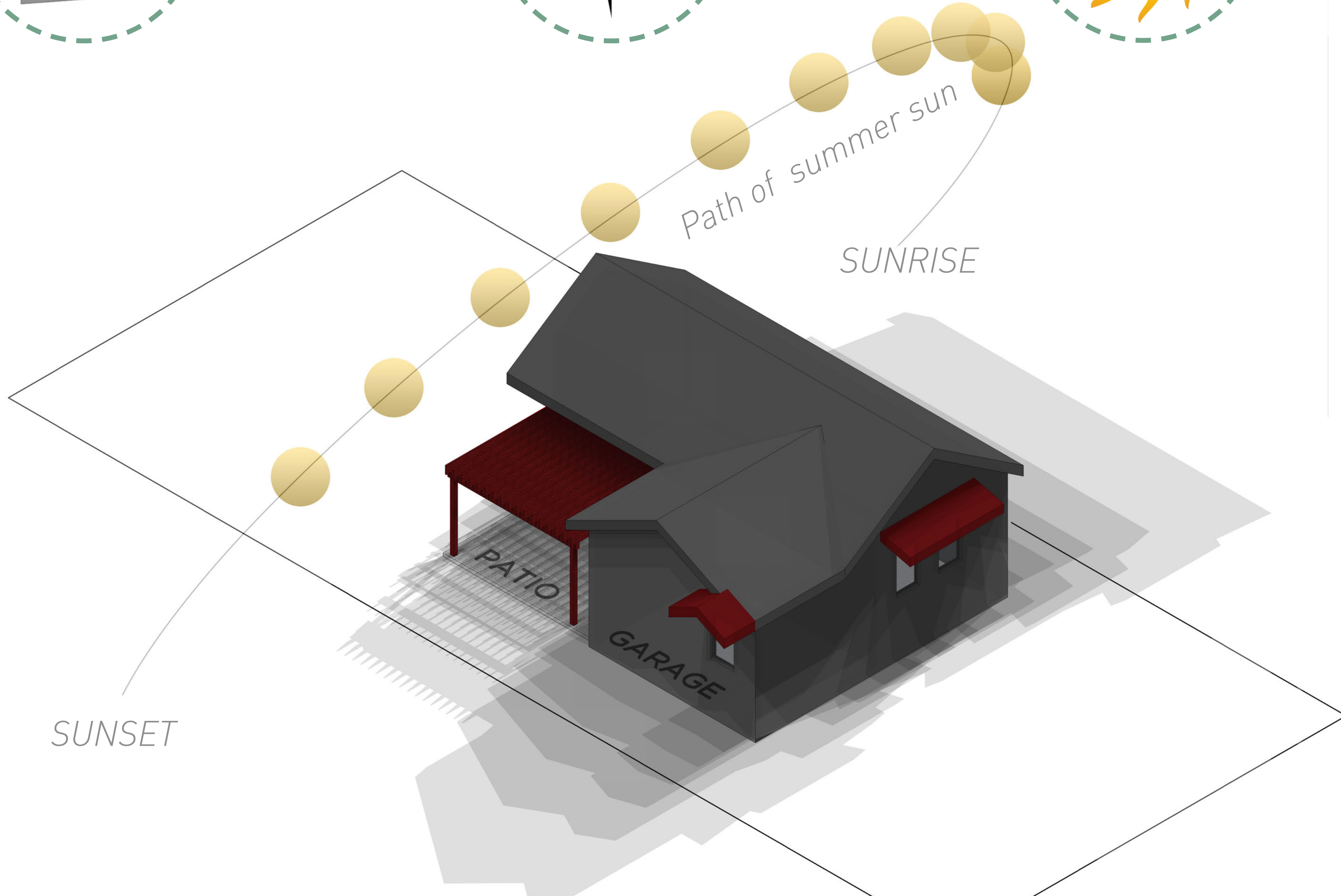
Cooling costs were found to be reduced with the addition of exterior shades  
- \$50 / yr

*Orientation*

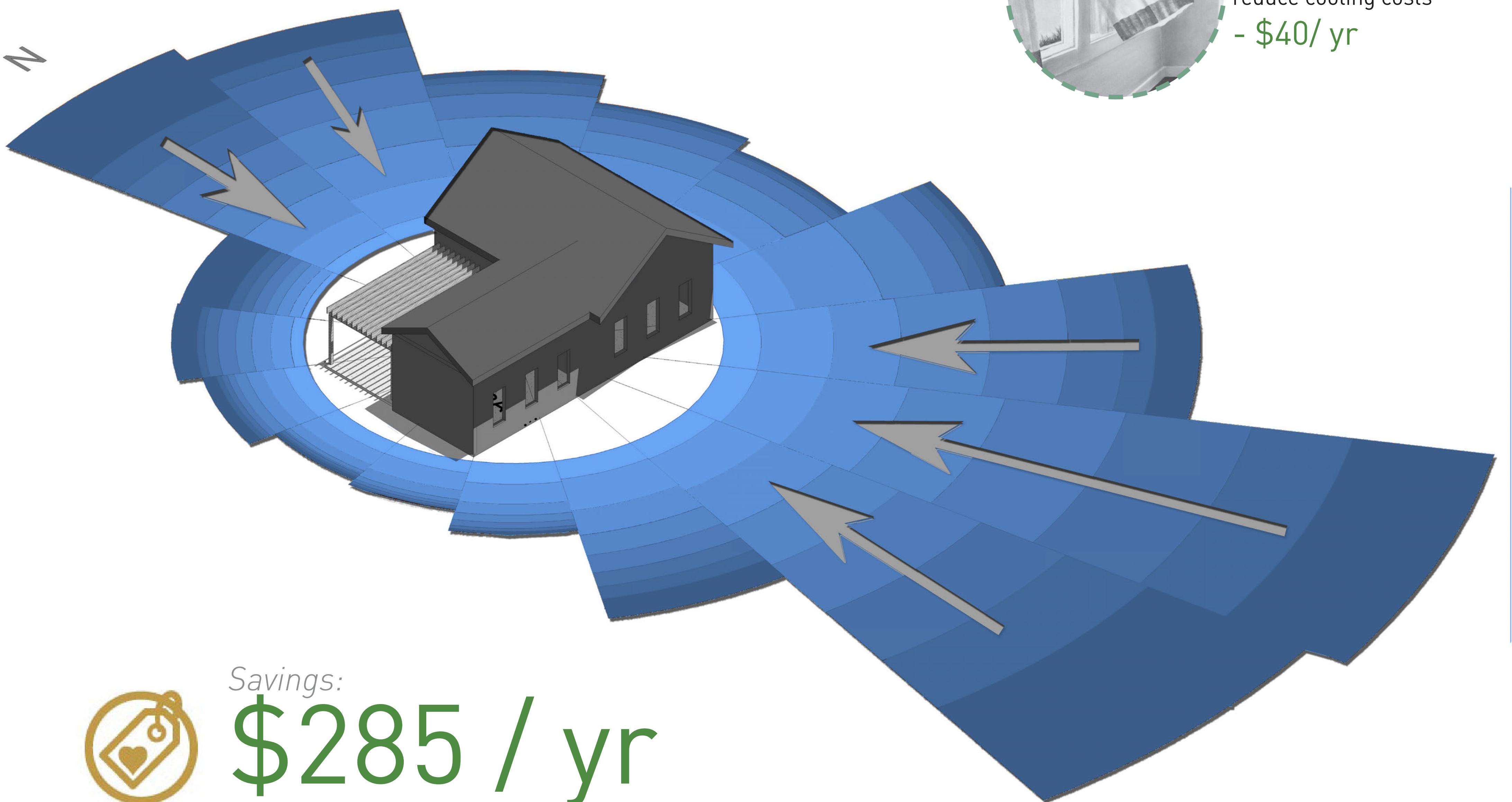
KB homes with the front door facing south were found to perform the best  
- \$75/ yr

*Insulation Spaces*

KB homes with a garage and patio facing west were found to reduce cooling costs  
- \$120/ yr

*Natural Ventilation*

KB Homes with more windows facing prevailing winds were found to reduce cooling costs  
- \$40/ yr



Savings:



\$285 / yr



## 11

## HOW IMPROVED APPLIANCES SAVES \$



*Instant Hot Water*  
Tankless hot water heater  
uses electricity only when  
needed

Purchase price of \$1,500 for 3 units  
Federal rebate of \$150  
Total cost=\$1,350

- \$210 / yr  
after 6.5 years



*Air Conditioner*

Increased efficiency from  
14-SEER to 17-SEER  
means electricity savings  
Price difference is \$700  
Federal rebate of \$300  
Total cost=\$400

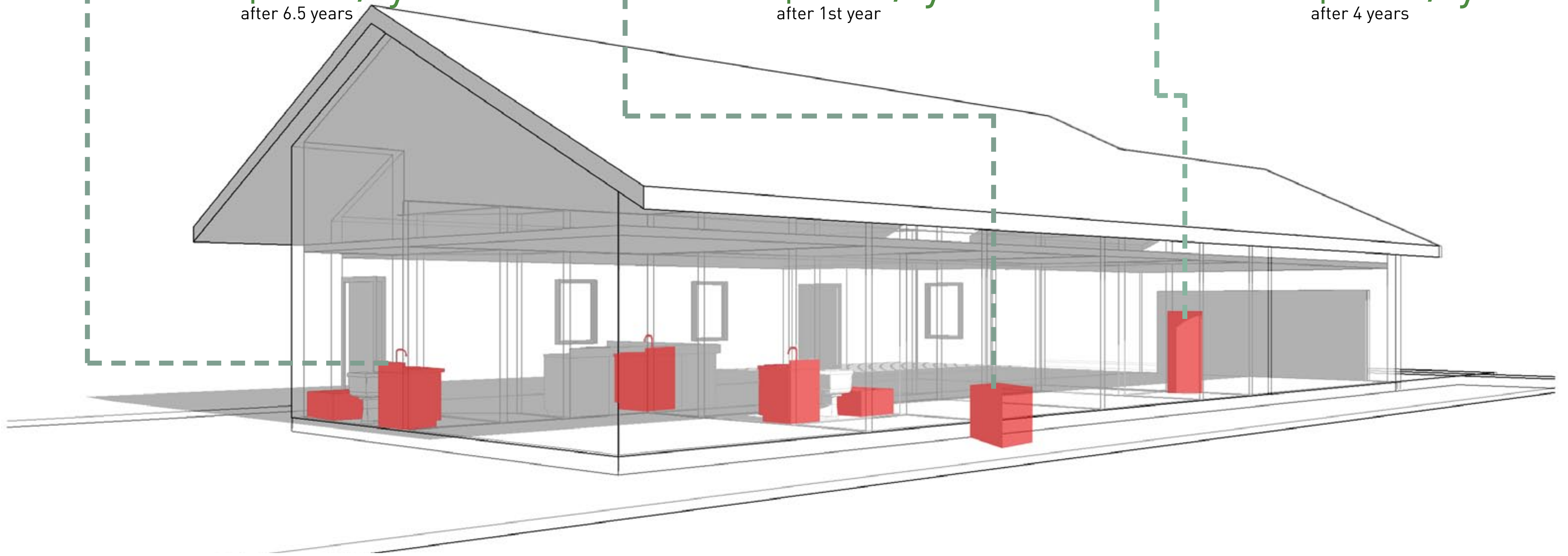
- \$520 / yr  
after 1st year



*Hot Water Heater*  
Energy efficient traditional  
tank-heater

Purchase price of \$1,500  
State rebate of \$300  
Total cost=\$1,200

- \$300 / yr  
after 4 years



Savings:



\$1,030 / yr

## 12

## HOW IMPROVED MATERIALS SAVES \$



*Modular Trellis &  
Vertical Garden*

Shading and support  
structures to grow veggies

Construction cost of \$500

- \$75 / yr  
after 6.5 years

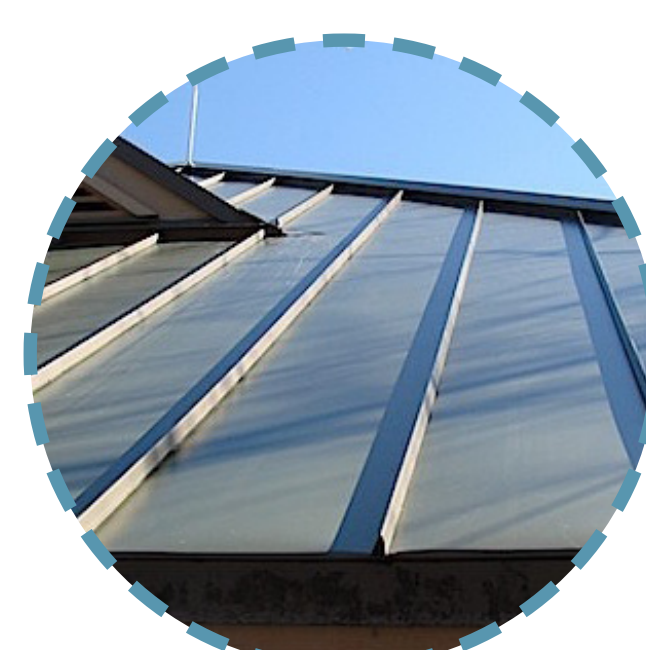


*Solar Water  
Heater*

Heats up water for  
domestic use

Purchase price is \$6,100  
Federal rebate of \$2,000  
Total cost=\$4,100

- \$425 / yr  
after 9.5 years



*Galvaluminum  
Redundant Roof*

Reflects 80% of sun heat with  
twice the normal roof lifespan

Construction cost difference is \$4,300  
Federal rebate of \$500  
Total cost=\$3,800

- \$200 / yr  
after 19 years



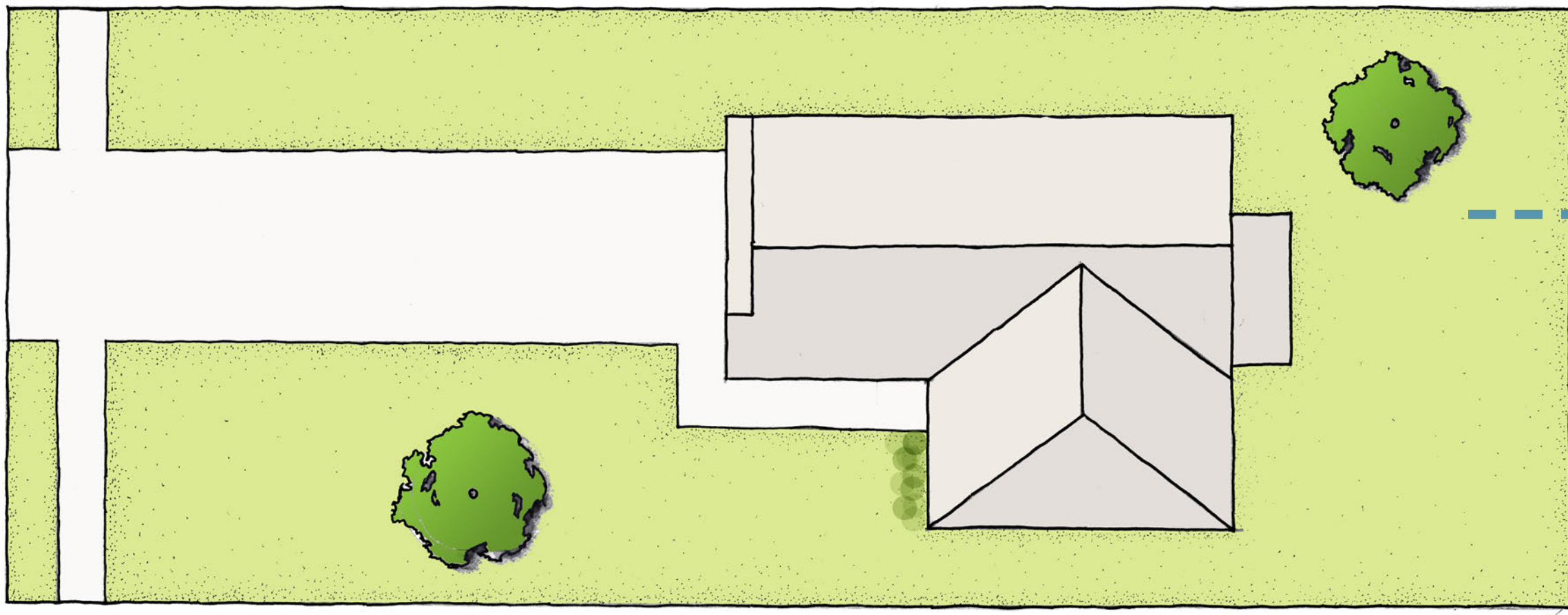
Savings:



\$700 / yr



# 13 HOW LANDSCAPE SAVES



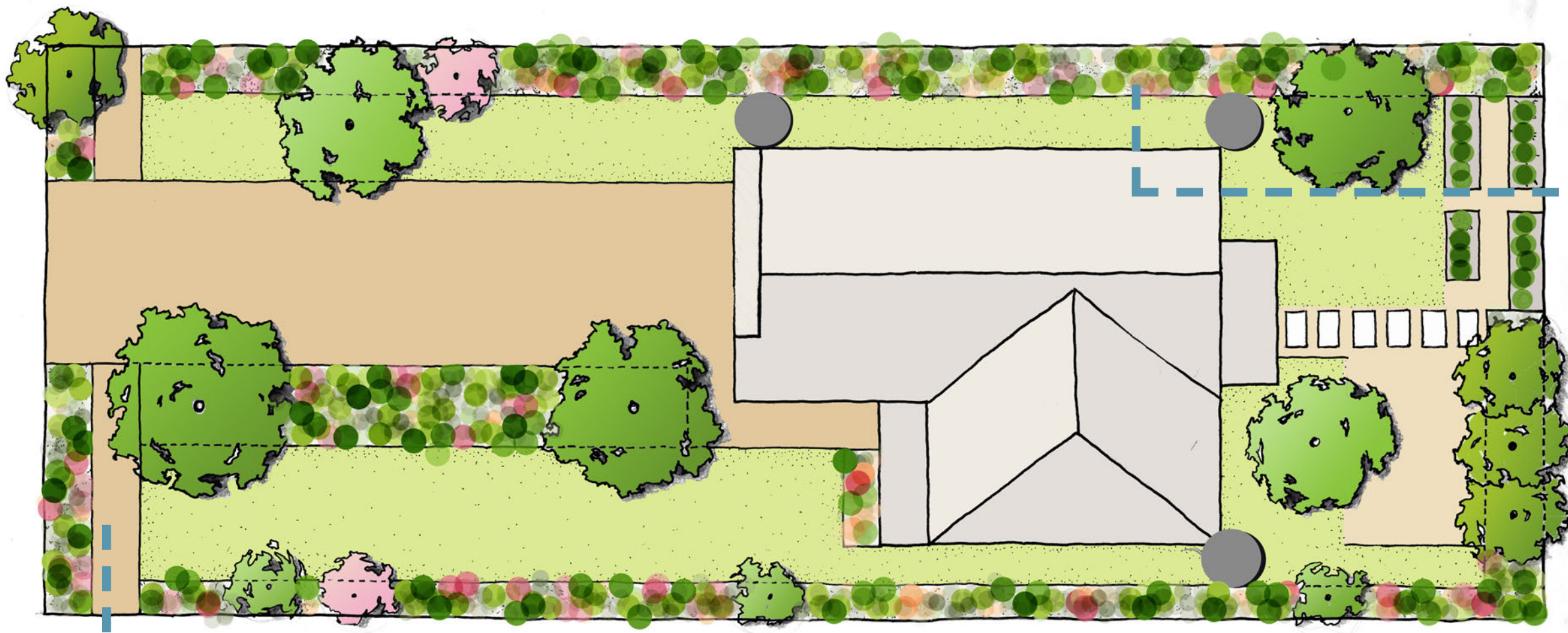
*Traditional*



*St. Augustine turf*  
not native to Texas, and  
requires consistent  
watering and fertilization  
costs = \$780 / yr irrigation  
Savings **\$0 / yr**



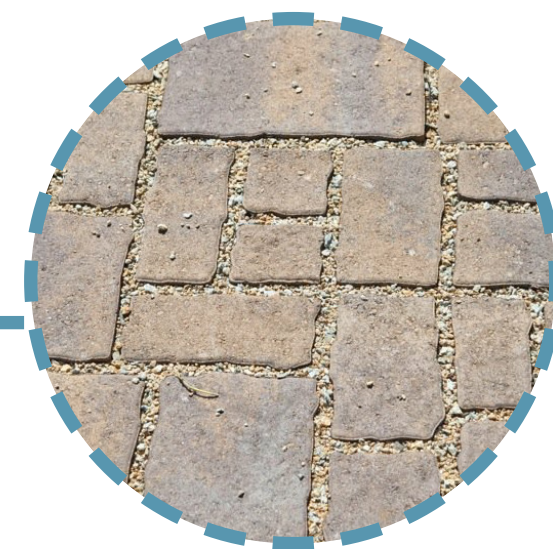
*Buffalo grass*  
a native alternative to St.  
Augustine, it requires little  
water or maintenance  
costs = \$300 / yr irrigation  
Savings **\$480 / yr**



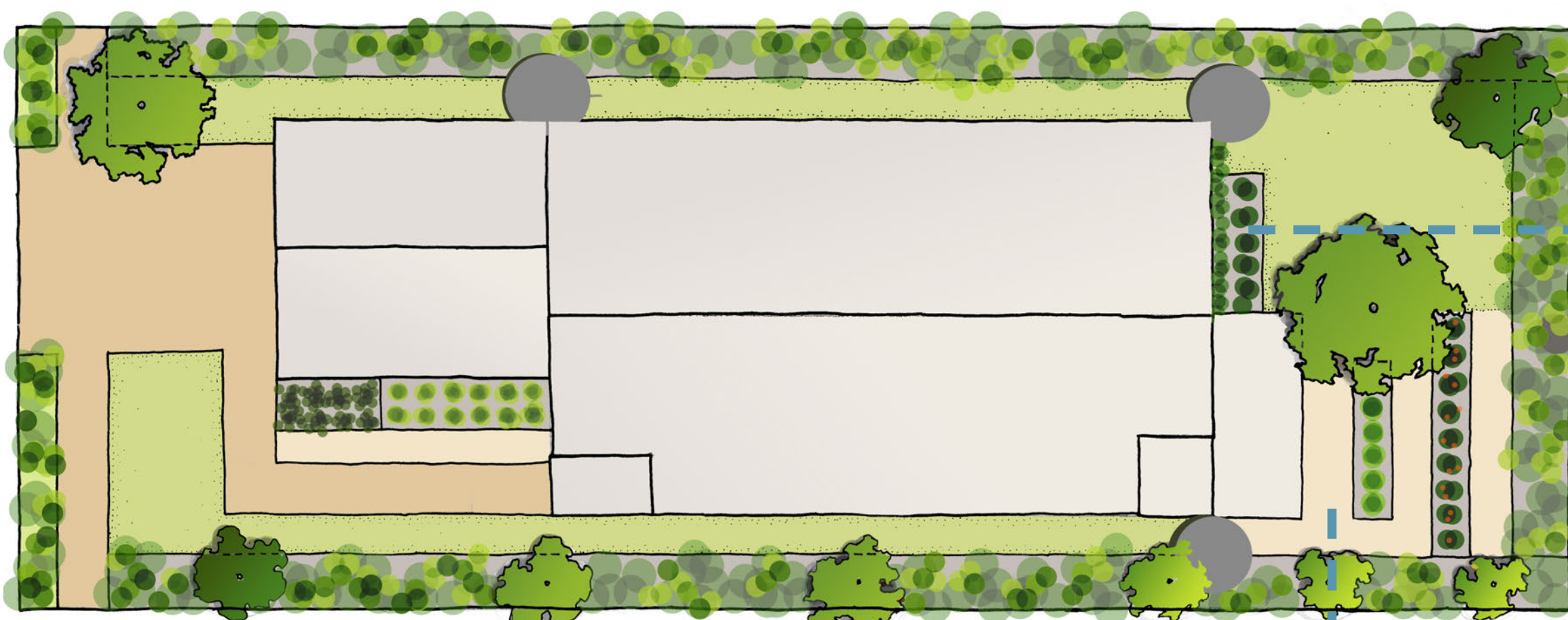
*Native Ornamental*



*Lantana*  
native flowering perennials  
offer year-round visual  
interest and wildlife habitat  
costs = \$50 / yr irrigation  
Savings **\$150 / yr**  
after 1 year



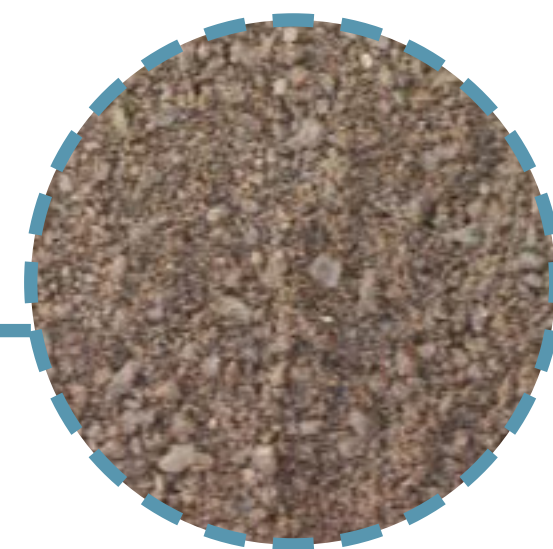
*Permeable paving*  
allows rain water to  
infiltrate the ground faster  
than concrete  
costs = \$6,600  
Savings **-\$3,600 / yr**  
after 1 year



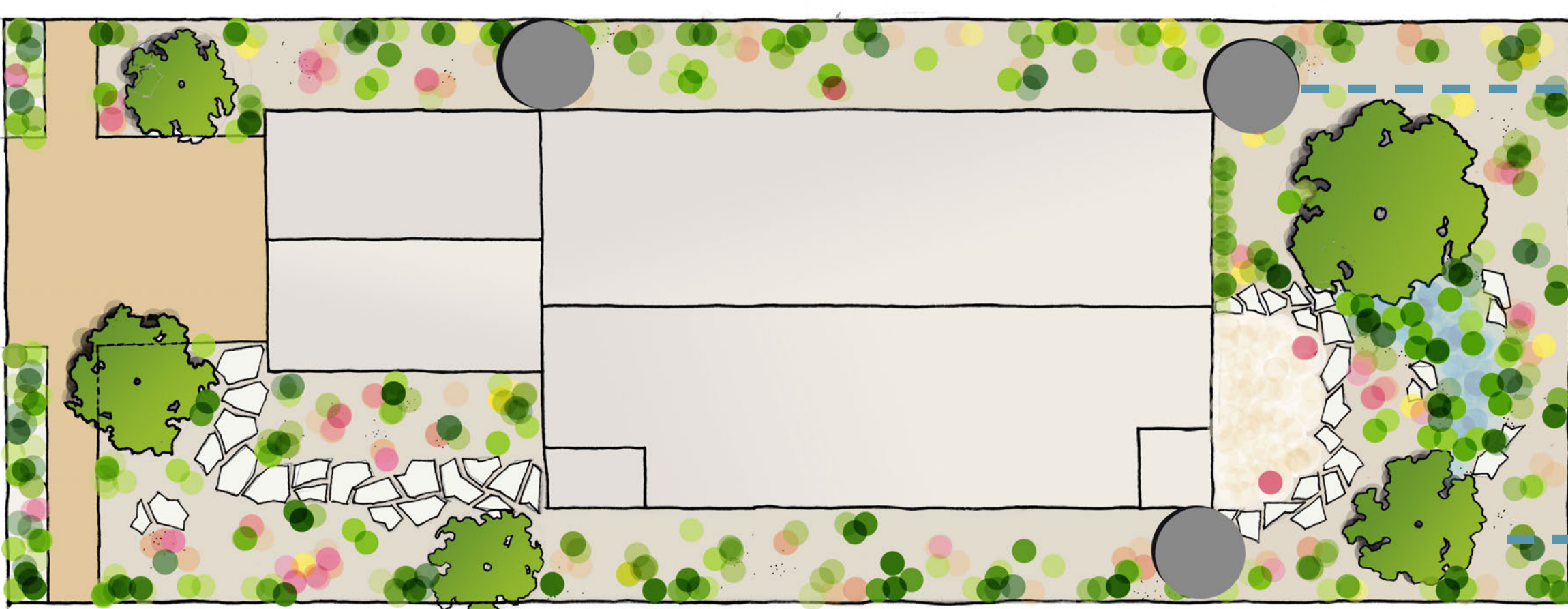
*Edible*



*Vegetable beds*  
encourage outdoor activity  
while reducing grocery  
bills.  
costs = \$70 / yr  
Savings **\$600 / yr**  
after 1 year



*Decomposed granite*  
provides a firm seating and  
path surface, while allowing  
water to permeate quickly  
costs = \$100 / granite  
Savings **\$90 / yr**  
after 1 year



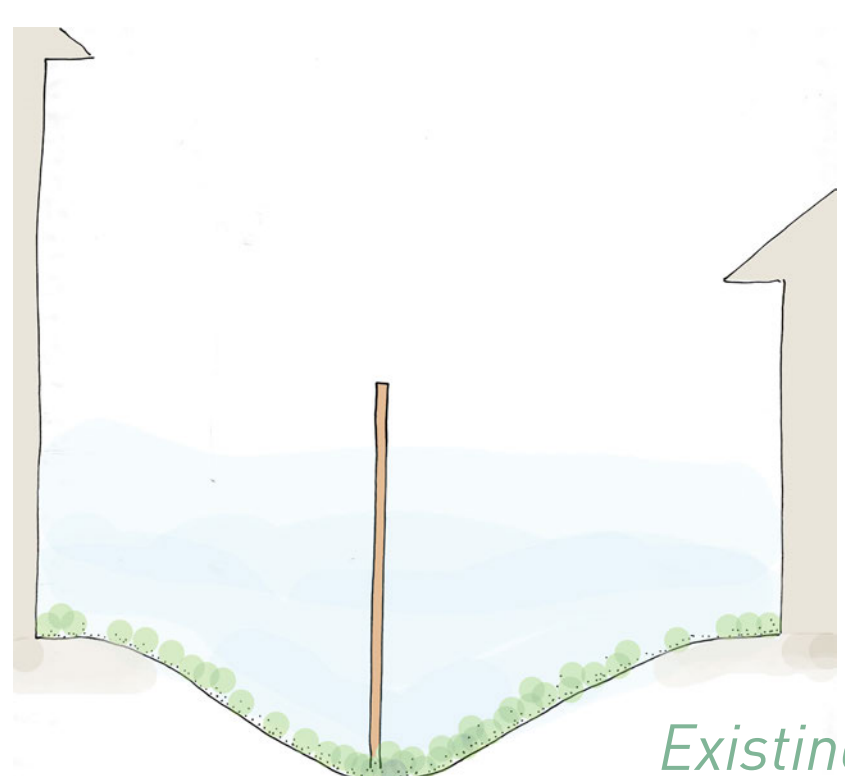
*Xeriscape*



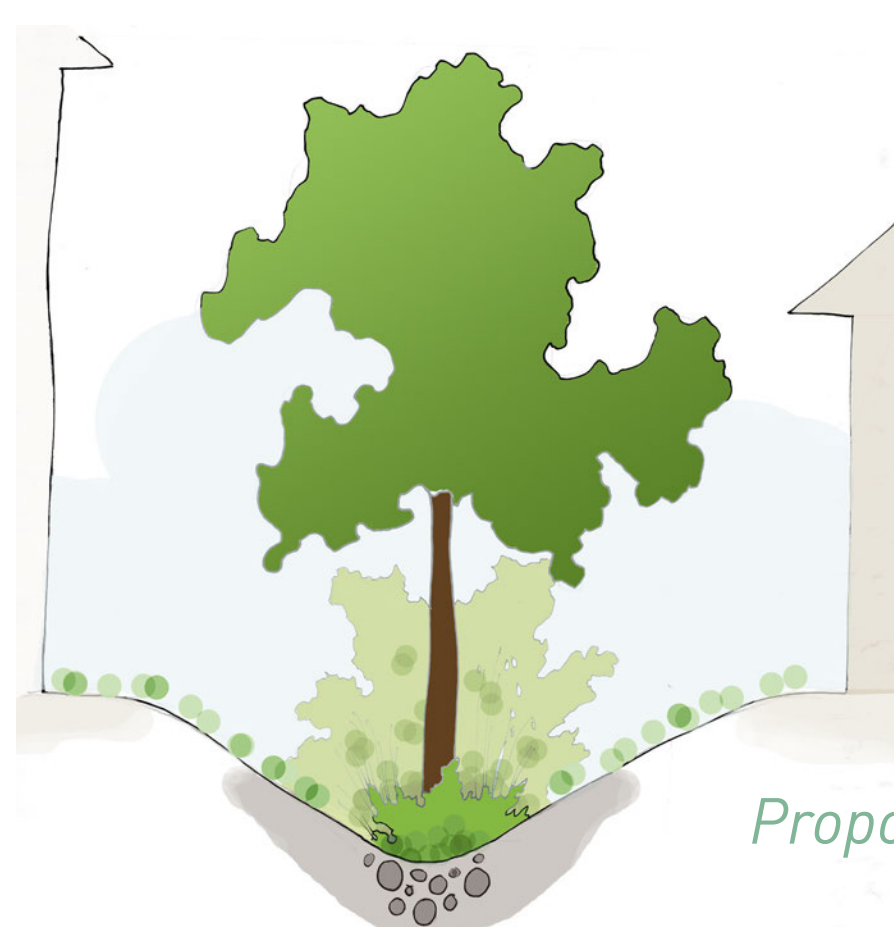
*Water cisterns*  
store large quantities of water  
for yard irrigation, reducing  
municipal water use  
costs = \$900 / cistern  
Savings **\$100 / yr**  
after 27 years



*Succulents*  
native to Texas,  
these plants are low  
maintenance and tolerant  
to drought conditions  
costs = \$3,500 plants  
Savings **\$150 / yr**  
after 5 years



*Existing*



*Proposed*



Savings:  
**\$480 / yr**



### Energy and cost savings

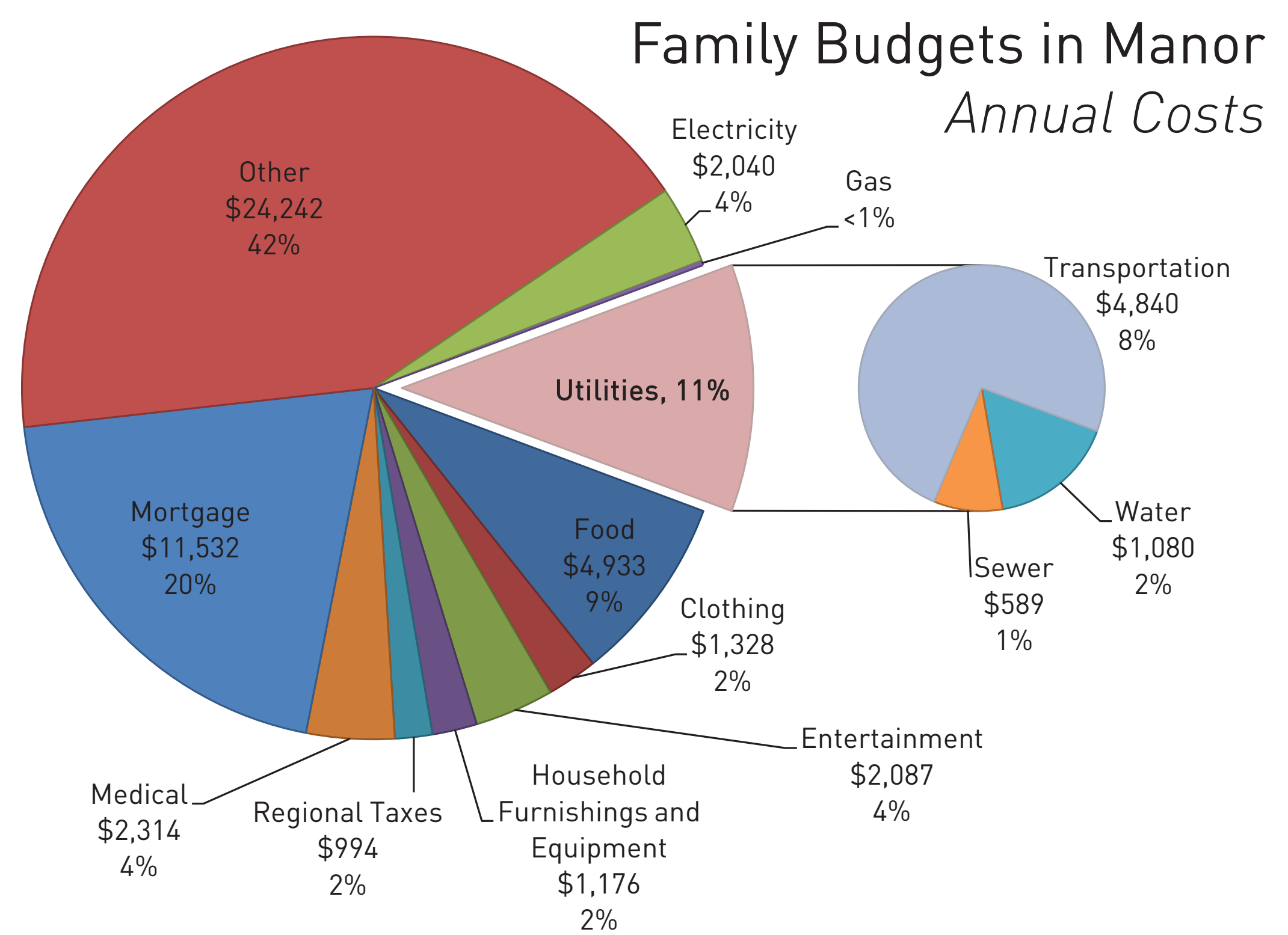
Energy and transportation costs are a major portion of household energy budgets

With these recommended design changes, utility costs can be reduced dramatically, leading to savings of over \$1,400 per year

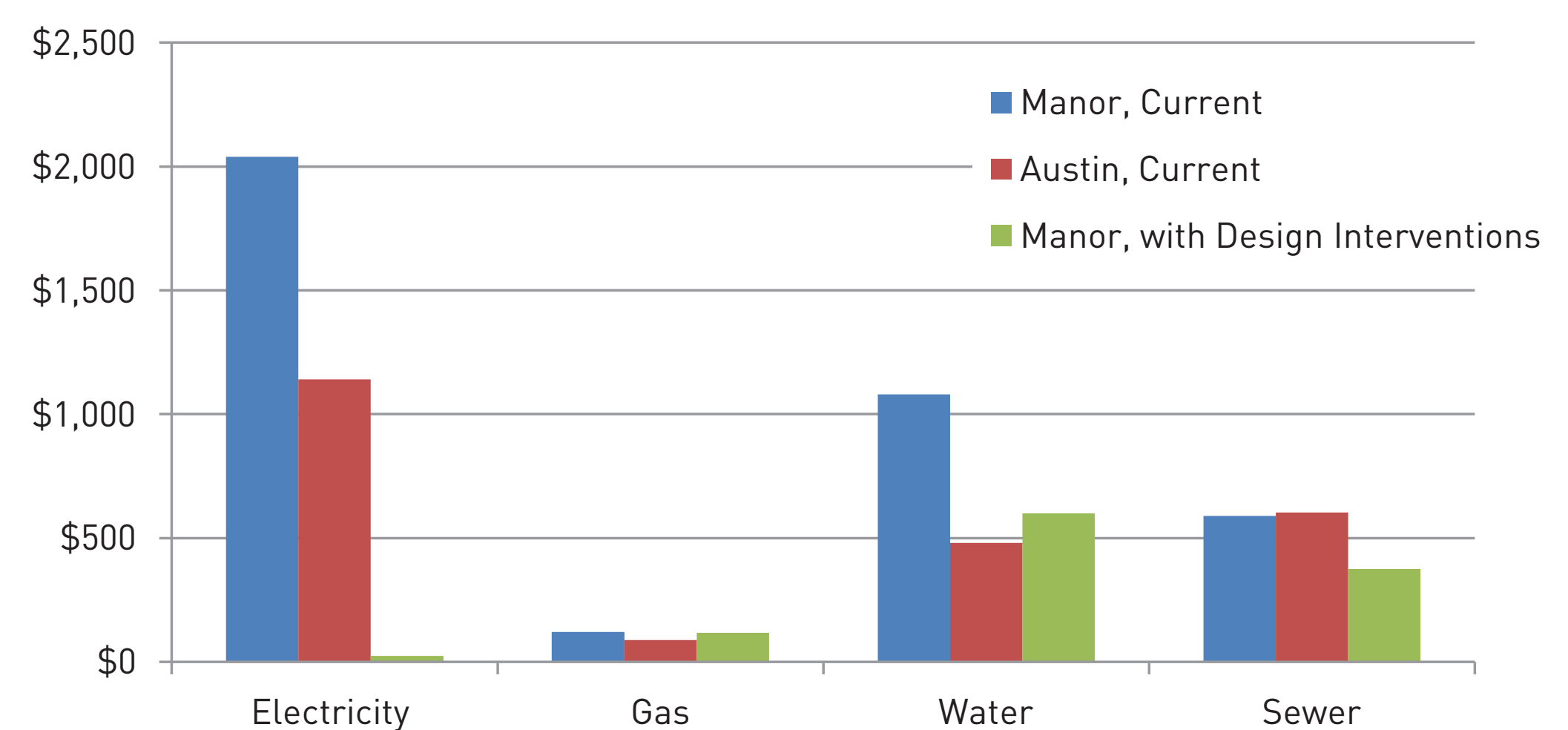
The value of these savings over time is tremendous, especially if invested. After 18 years, the return on investment exceeds \$25,000, which could help pay for children's college education or other major family expenses

#### Savings from Design Strategies

Annual	\$1,433
Invested for 10 Years	\$7,173
Invested for 18 Years	\$25,907



#### Yearly Utility Costs



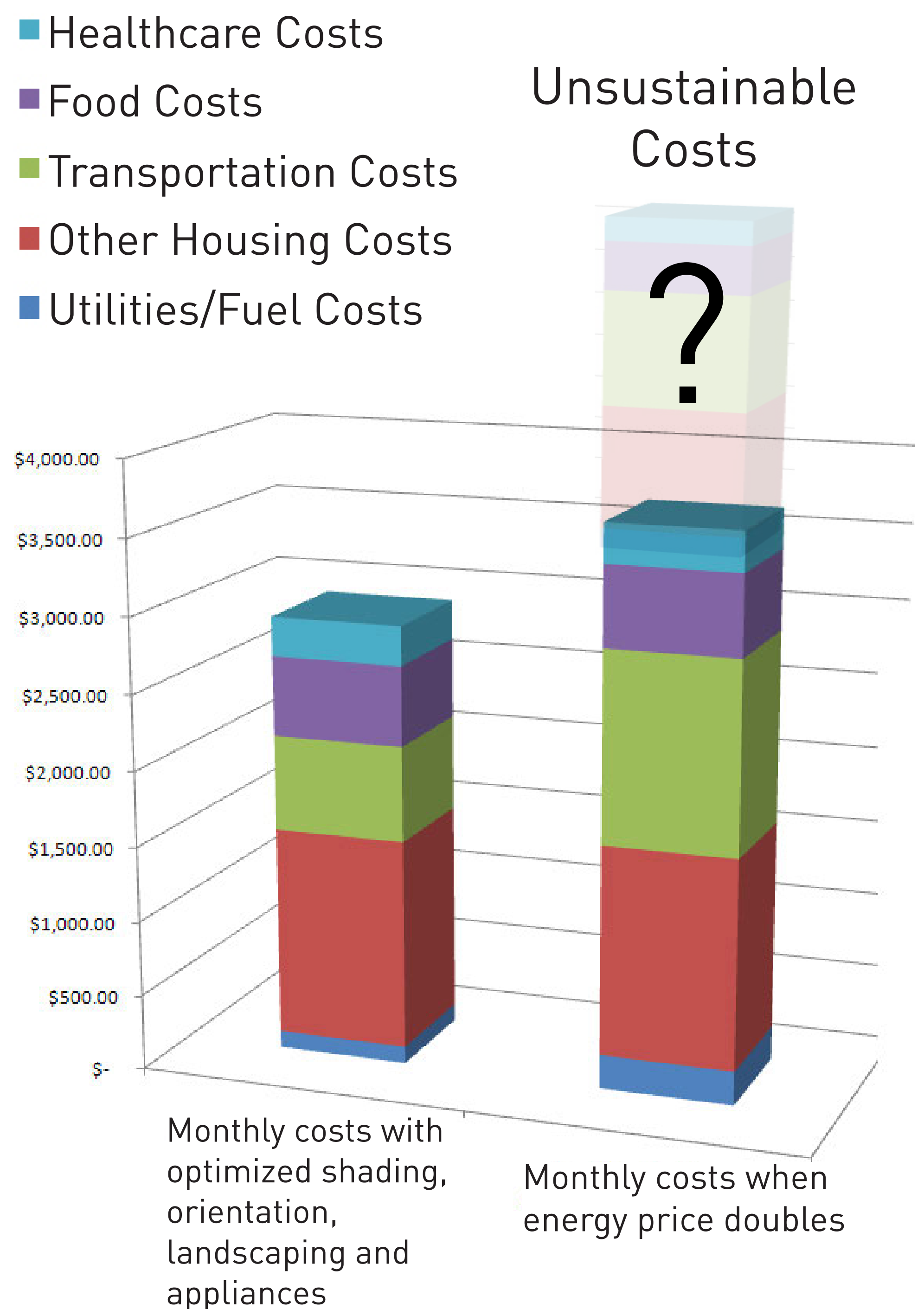
### How this affects your life

As anticipated by 2020 when price of energy doubles it will directly affect transportation and fuel costs

The graph on right shows a typical family's monthly costs of approximately \$2,750 can increase by almost one third, ~\$1,000 more than what they have been paying

The outlook is not optimistic when considering the effects energy cost increase will indirectly have on other costs such as housing, food, taxes, and possibly even insurances fees

The savings might be doubled in this case but costs are also doubled





## 16 WHAT IS NEXT?

# Sustainability is bigger than your home

Even when homeowners optimize conditions through good decisions  
the existing suburb is not sustainable



### *Home*

- More informed decisions
- Reduce energy and water usage
- Save more money

### *Neighborhood*

- Improve local policy
- Better parks and recreation
- Resource sharing
- Better water management

### *Regional Public Works*

- Improve regional policy
- Better transportation networks
- Expanded public works

## 17 BRING SUSTAINABILITY TO MANOR

*How can we take sustainability  
to the City of Manor?*

*Finding sustainable solutions is  
key, but Manor must first build the  
capacity to be self reliant*